

# Network Features

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... plug and play interconnect...

... intuitive interfaces ...

... Internet capable ...

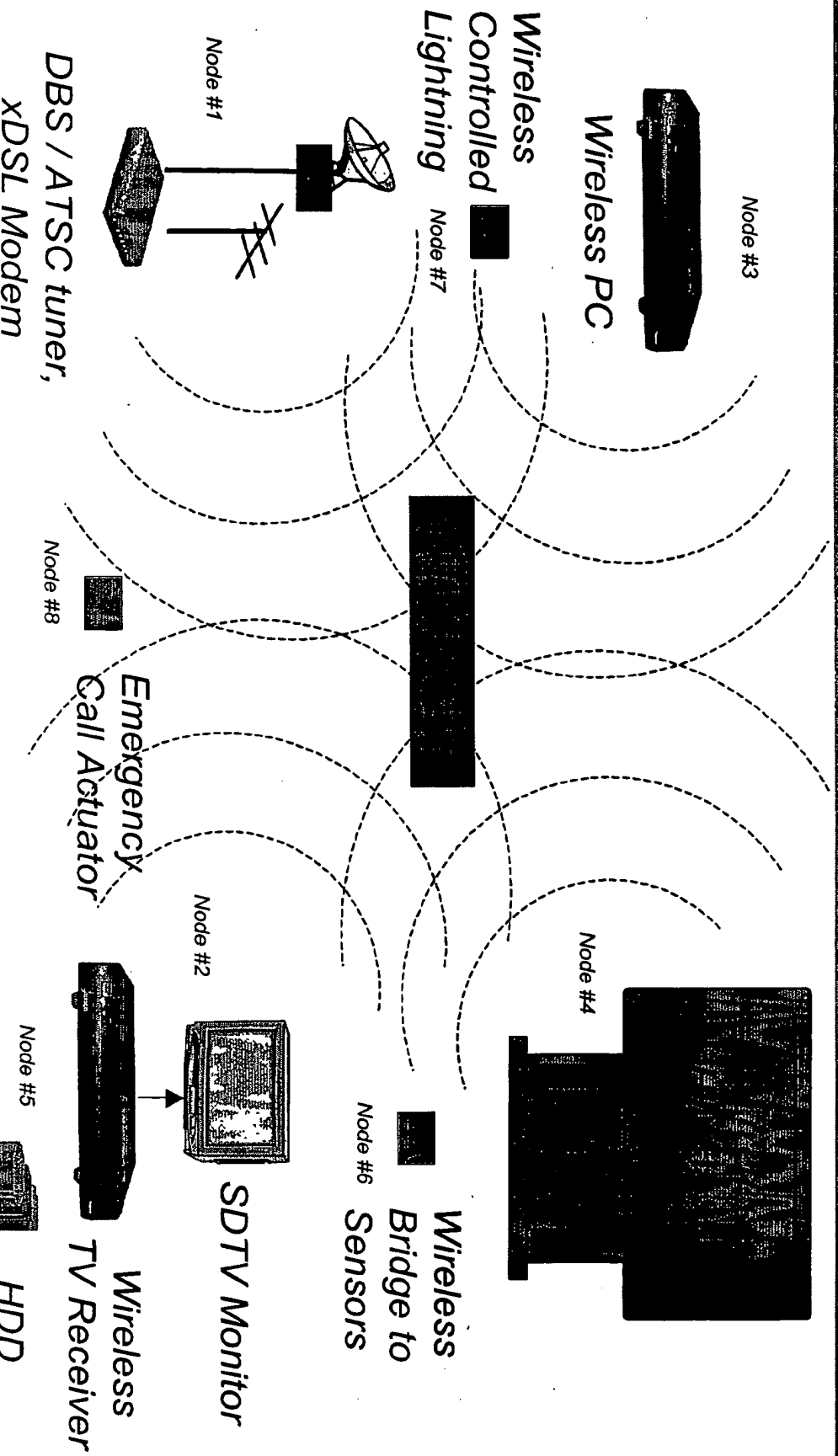
... DS / ATSC / xDSL and "open cable" support ...

... AOL compatible – "make it easy to use; put it everywhere" ...

F16-1

# The Network

F16.2



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# Broadband Home Wireless Portal

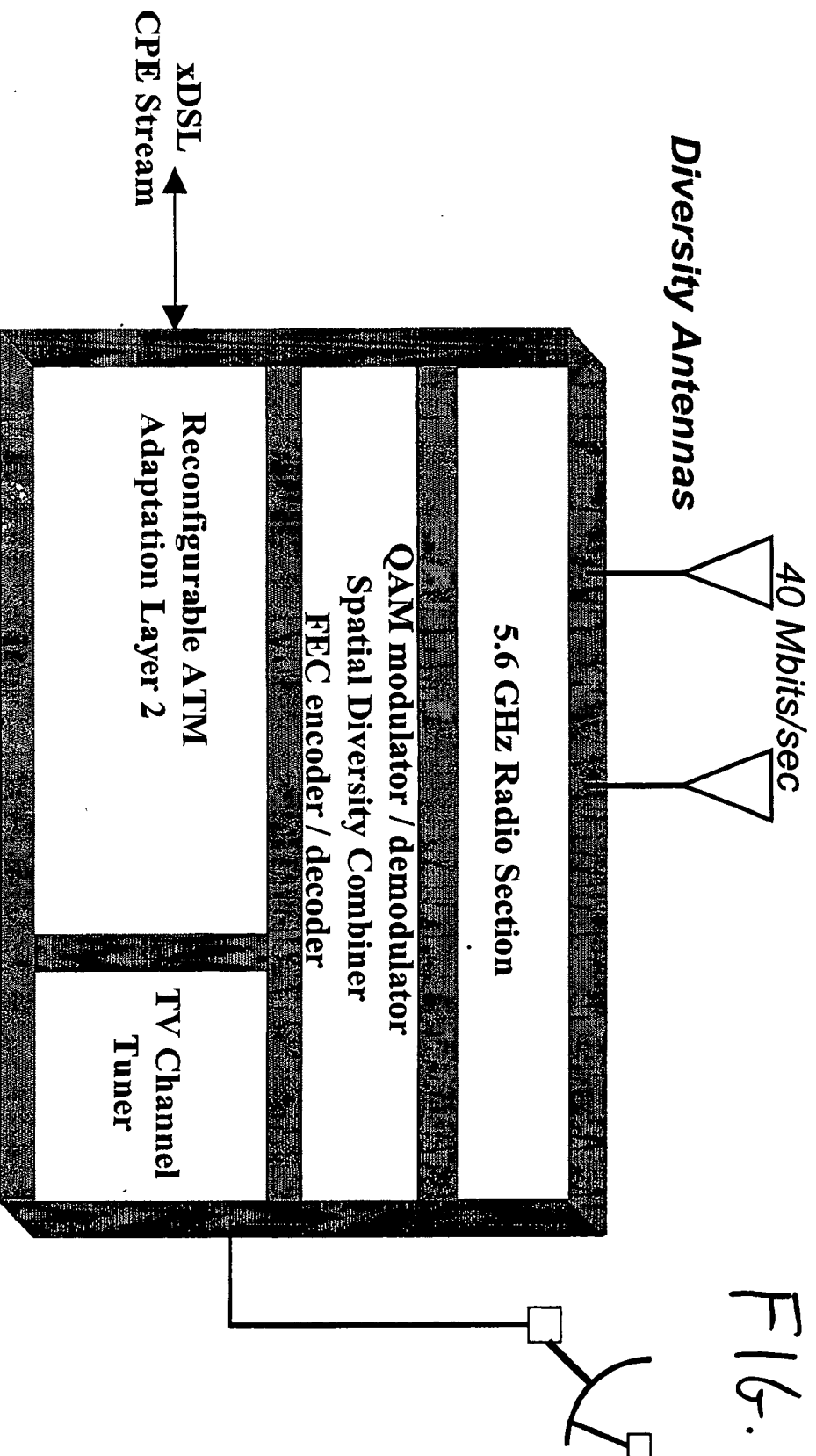


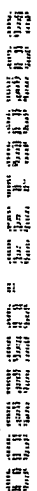
FIG. 3

# HDD Enables Home Services F16.4

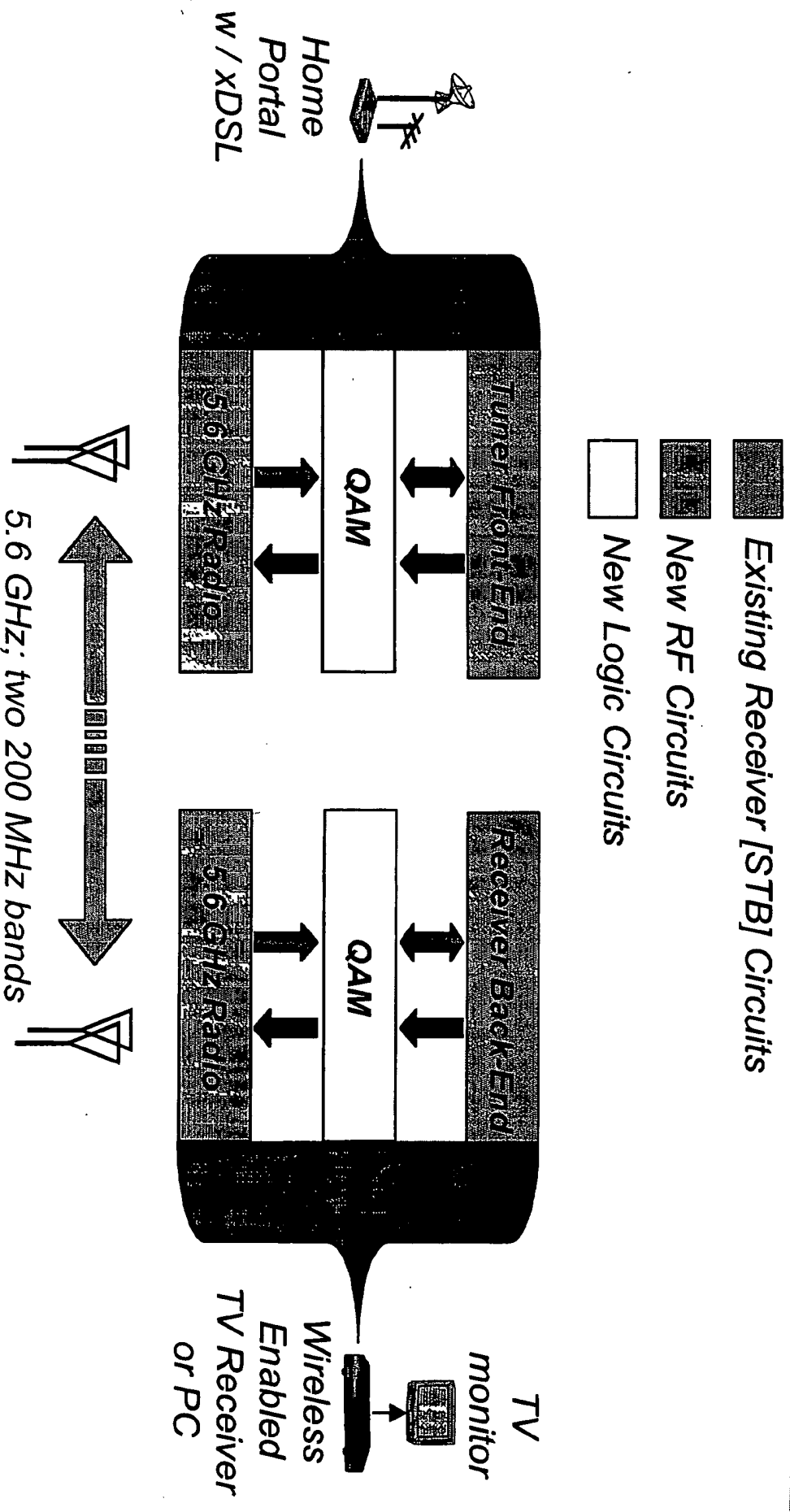
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- The HDD becomes the NATURAL repository for still images and video
  - ... wirelessly accessible from TVs and PCs
    - » Enables PVR
      - time shift viewing
      - snap-shot editing / print ordering / picture email
      - video-clip editing / video email
      - datacasting / e-commerce / impulse purchasing
      - indexing by video content / video archiving
    - » Support service access via xDSL and / or satellite for home management systems

F16.5



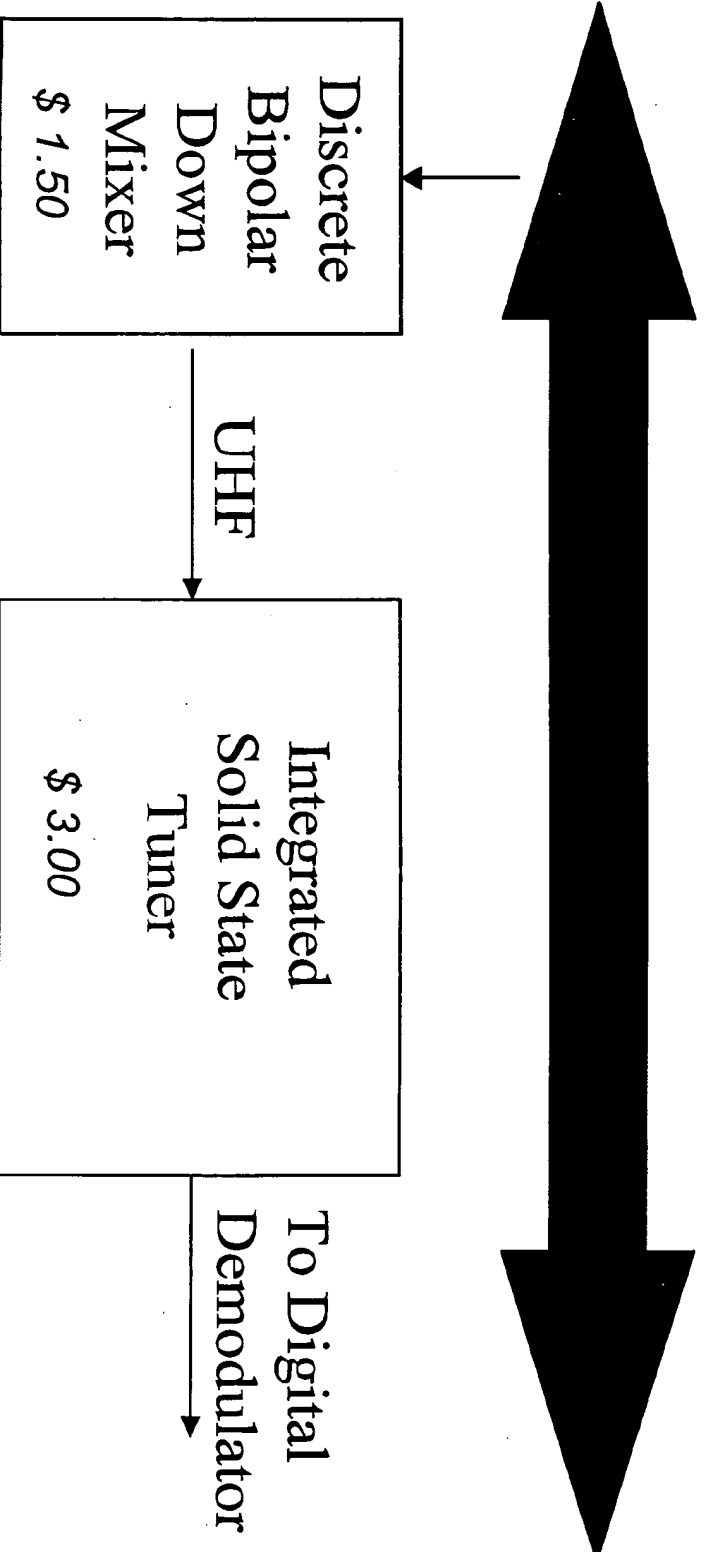
# In-Home Architecture F16.6



# RF Radio Architecture

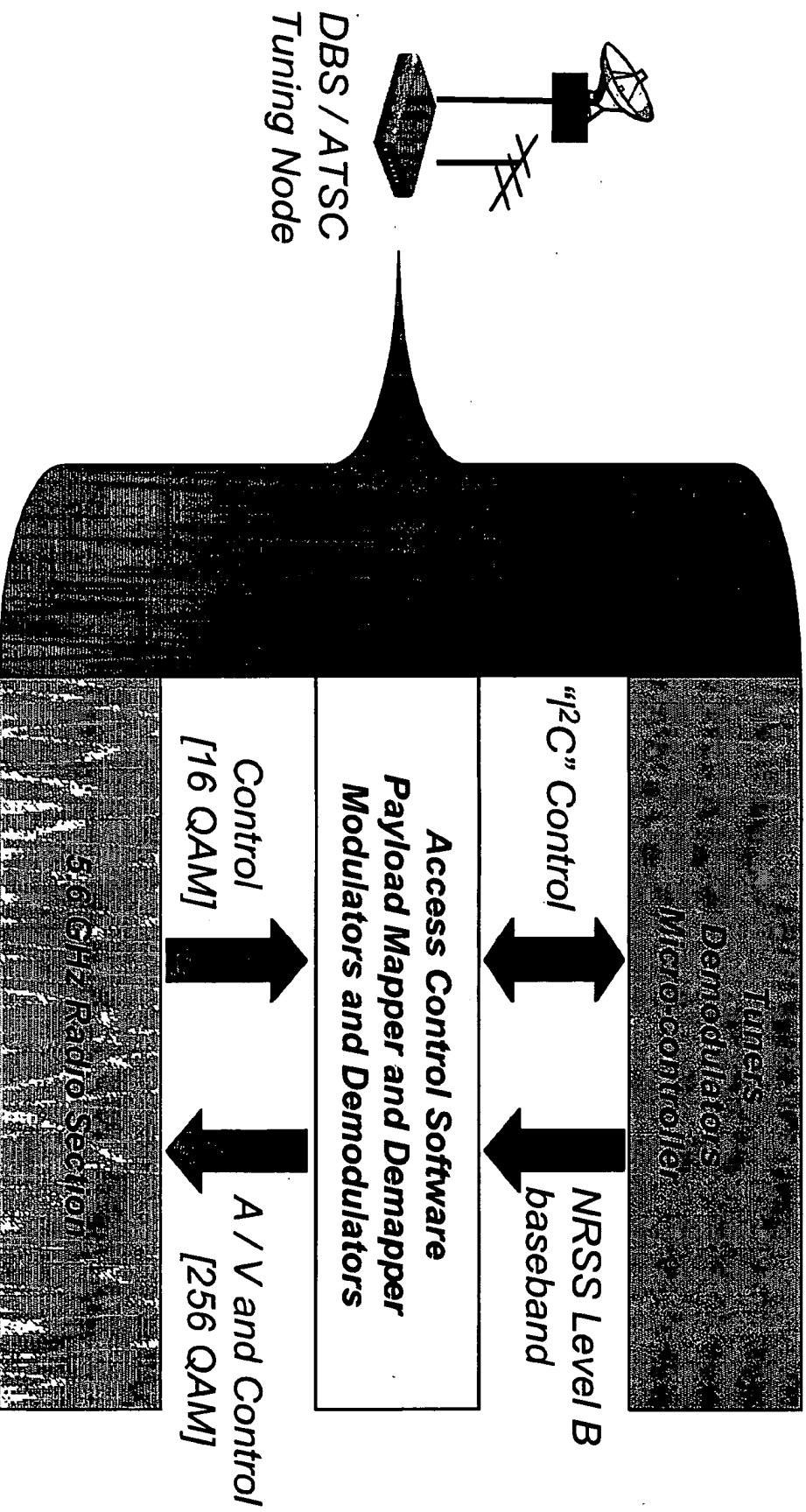
F167

5.6 GHz Broadband  
60 two-way channels  
CSMA/CD  
(carrier sense multiple access with collision detection)



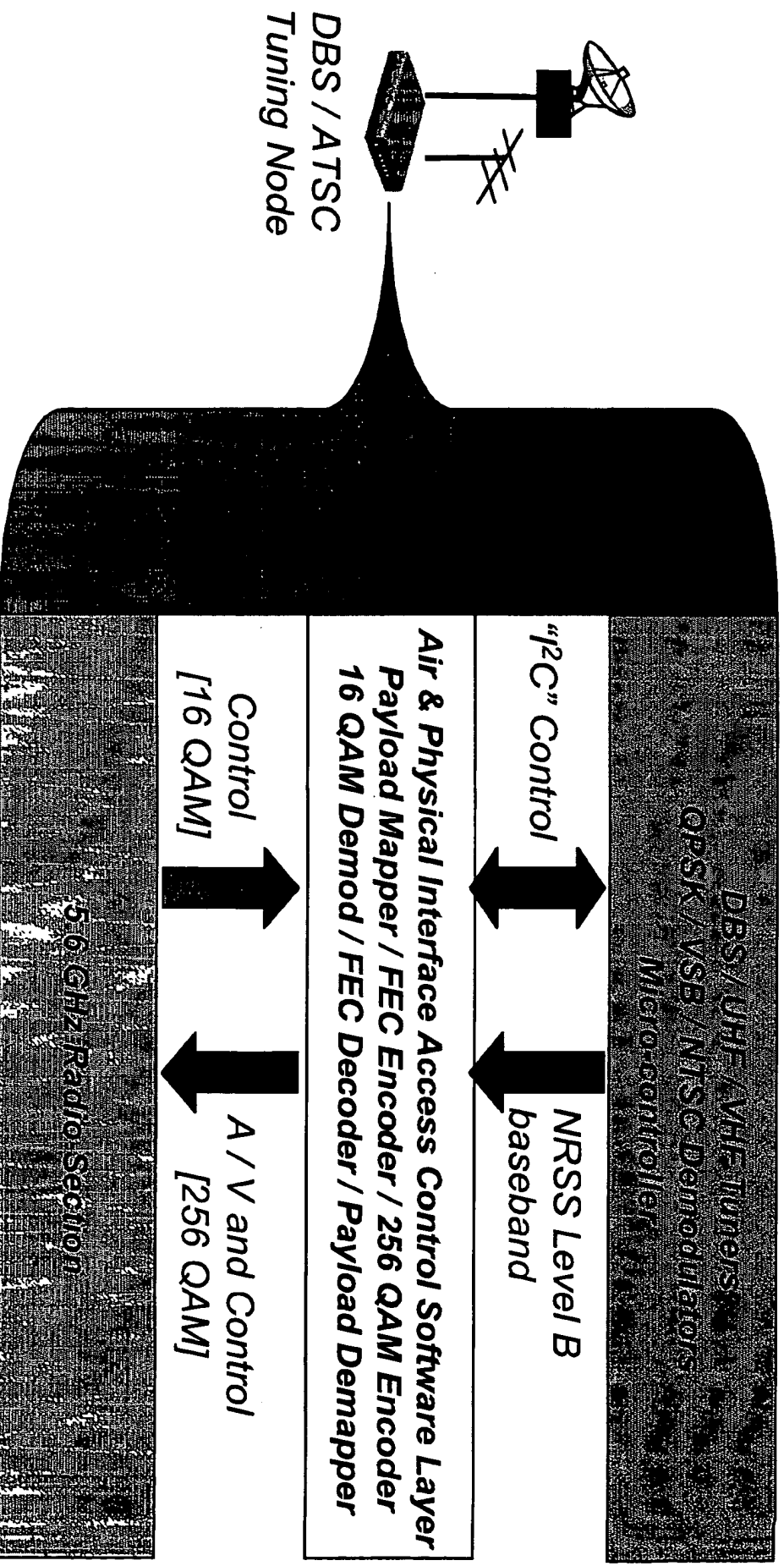
# DBS / ATSC Tuner Node

F168



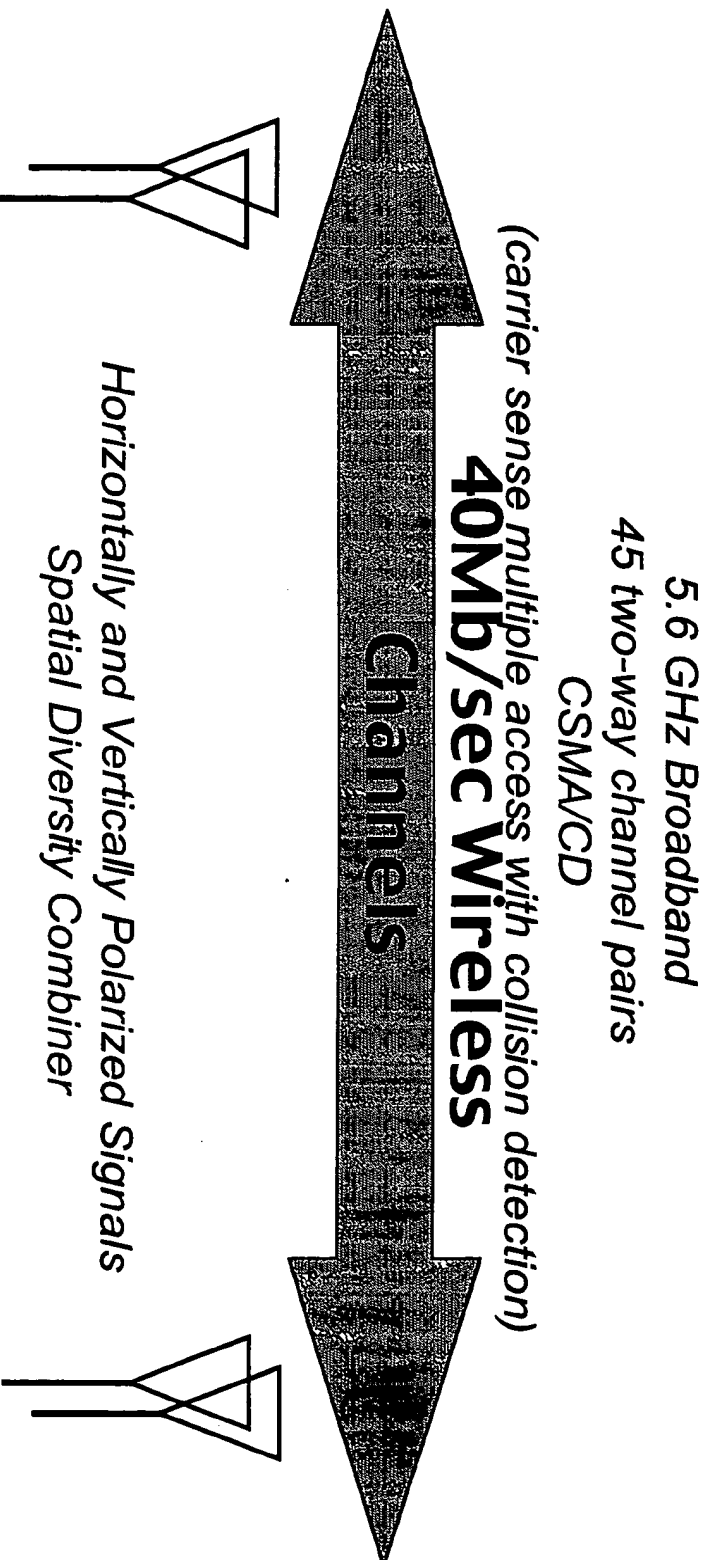


# DBS / ATSC Tuner Node F16.9



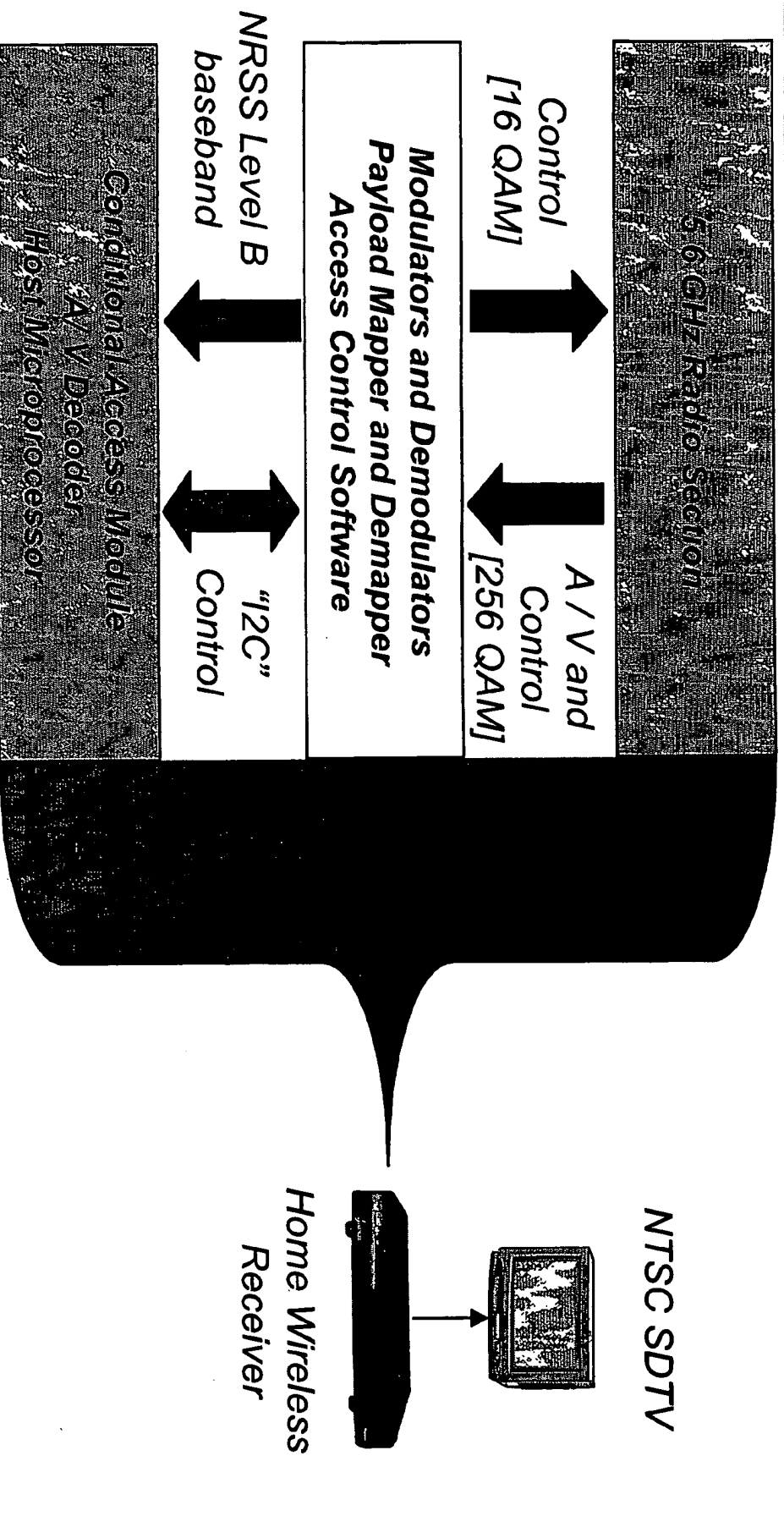
# Architecture

F16.10



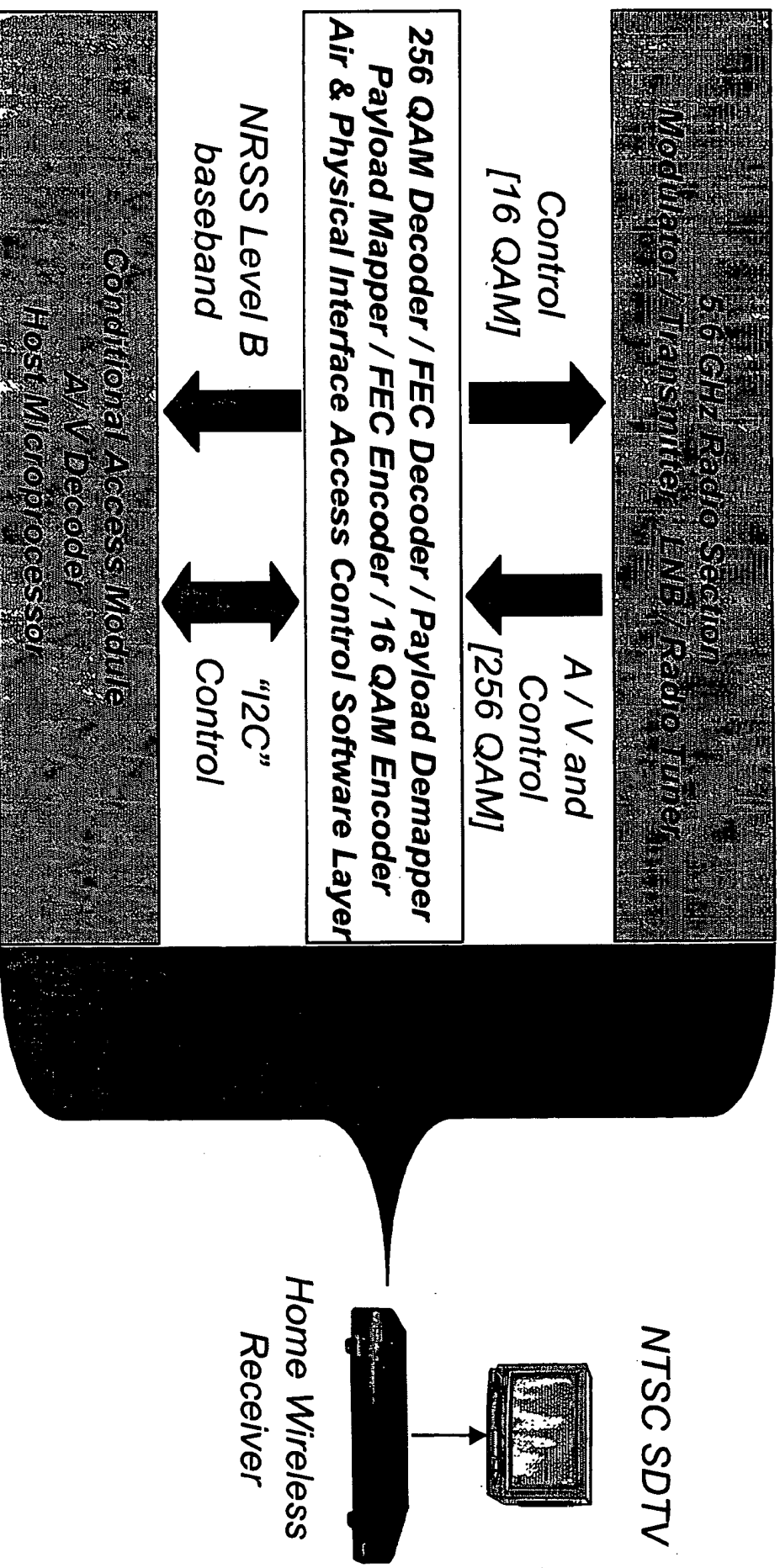
# DTV Receiver Node

F16-71



# DTV Receiver Node

F1672



# QAM Meets System Requirements

F16-13

- » Data rate: For handling DBS HDTV feeds, channel data rates must approach 40 Megabits/sec.
- » Low cost (<\$50 retail adder per node): The overall system architecture must intrinsically enable "low cost."
- » Near neighbor interference: The total number of available channels must be large enough such that "near neighbors" in apartments, town homes, condos, etc., do not interfere with each other.

# Why Not COFDM?

F1614

- » What COFDM does:
  - Robust in dealing with multipath.
  - But COFDM trades-off multipath for increased bandwidth.
- » Larger bandwidth:
  - Introduces stringent demands on the RF circuit designer, and the selection of A/D and D/A signal conversion components [phase noise and linearity].
  - Reduces available channels by 50% -- opens the door wider to potential interference between “near neighbors.”
- » Increased cost:
  - Higher peak power handling for radios.
  - Higher resolution signal converters.
  - Logic gate counts increased by about 1.5X.

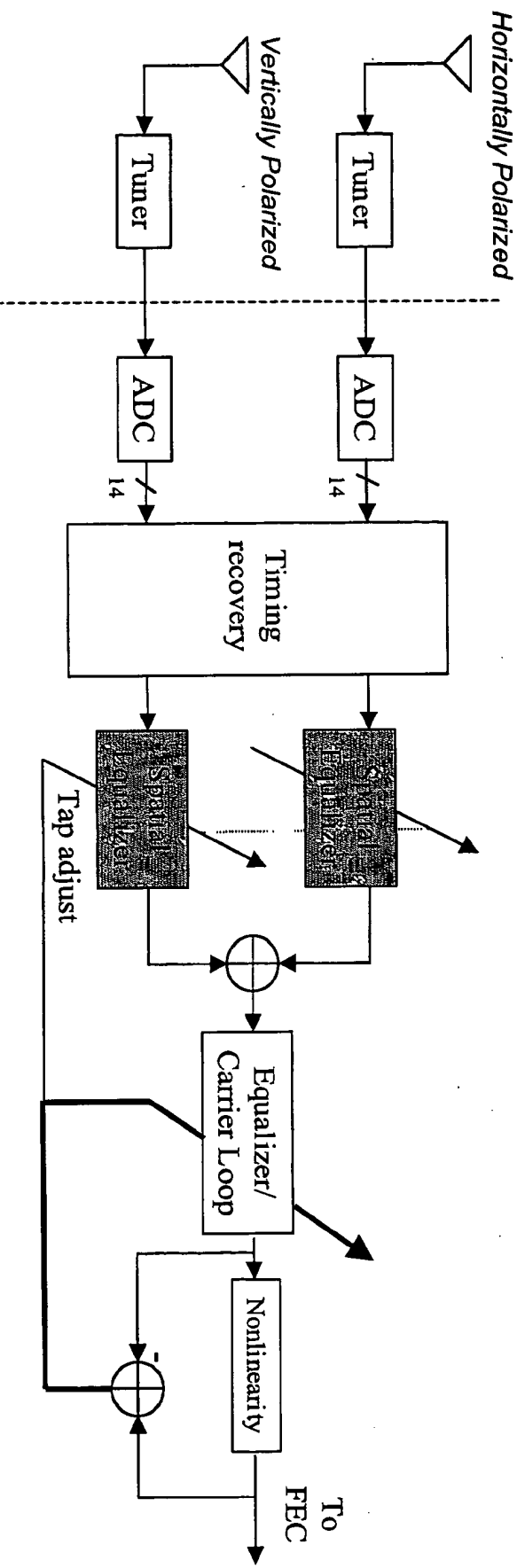
# Handling In-Home Multipath with QAM

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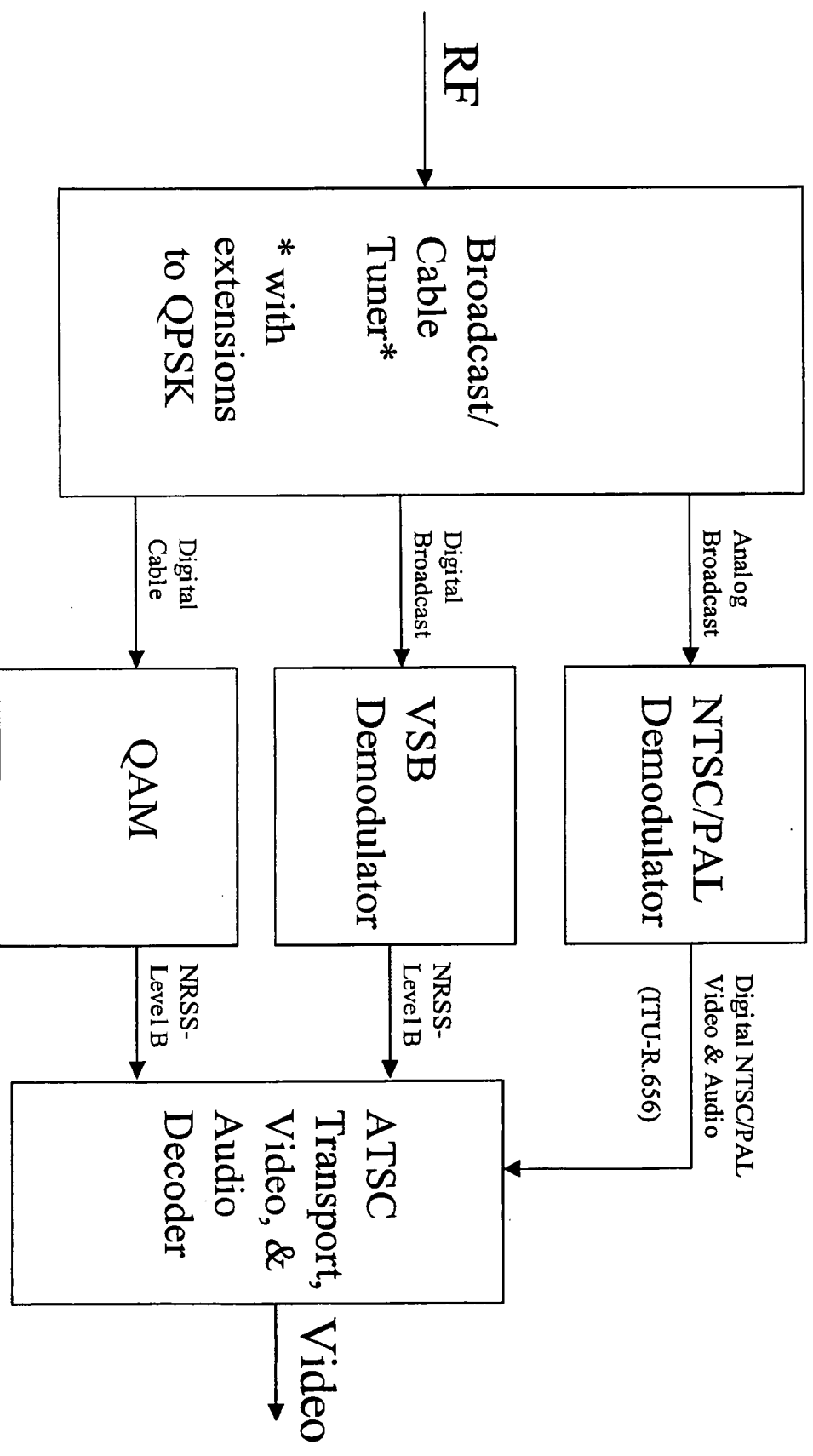
- » Increase channel bandwidth on the order of 20%:
  - Increasing channel bandwidth from 6MHz to a little over 7MHz may enable demodulators to deal with higher levels of multipath.
- » Reduce the modulation system to 128- or 64-QAM:
  - Reducing size of symbol constellation increases symbol spacing and thus enhances system's ability to deal with elevated channel noise.
  - To maintain 40 Mbps channel rates, must increase bandwidth by ~30%.

# Spatial Diversity Combiner *FLC 16*



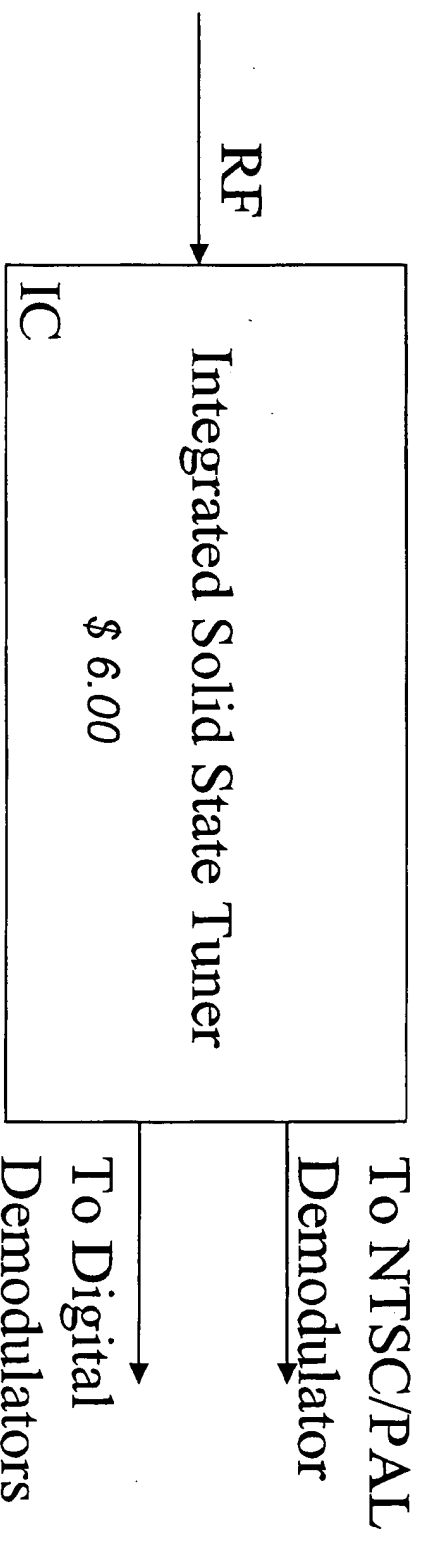


# Discrete Tuner Technology *Fl6-17*

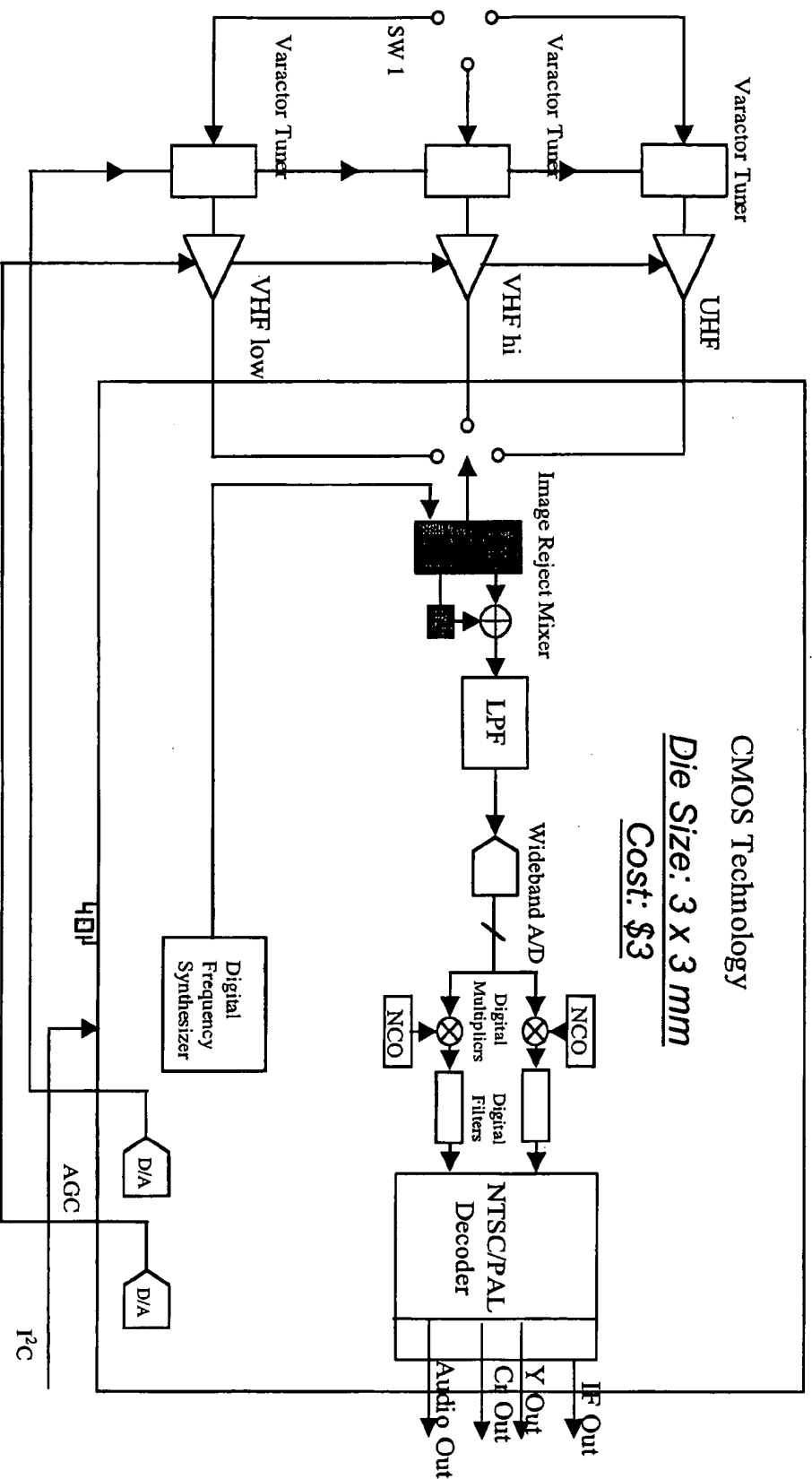


# Solid State Tuner F1618

- A Single IC:
  - » RF input and digital outputs to NTSC/PAL and VSB/QAM Digital Demodulators
  - » 2H '00 product introduction



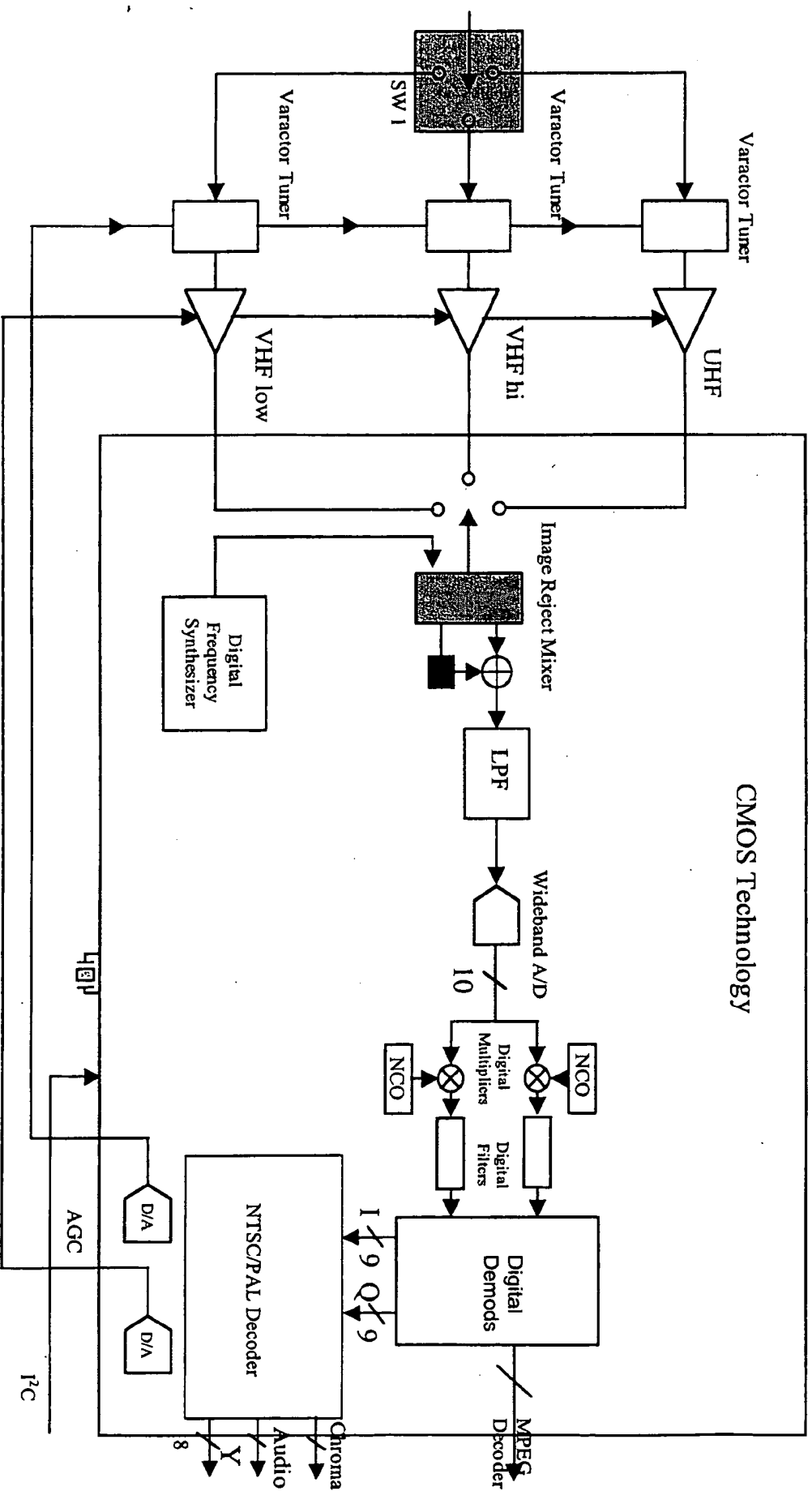
# CMOS Solid State Tuner *File 19*



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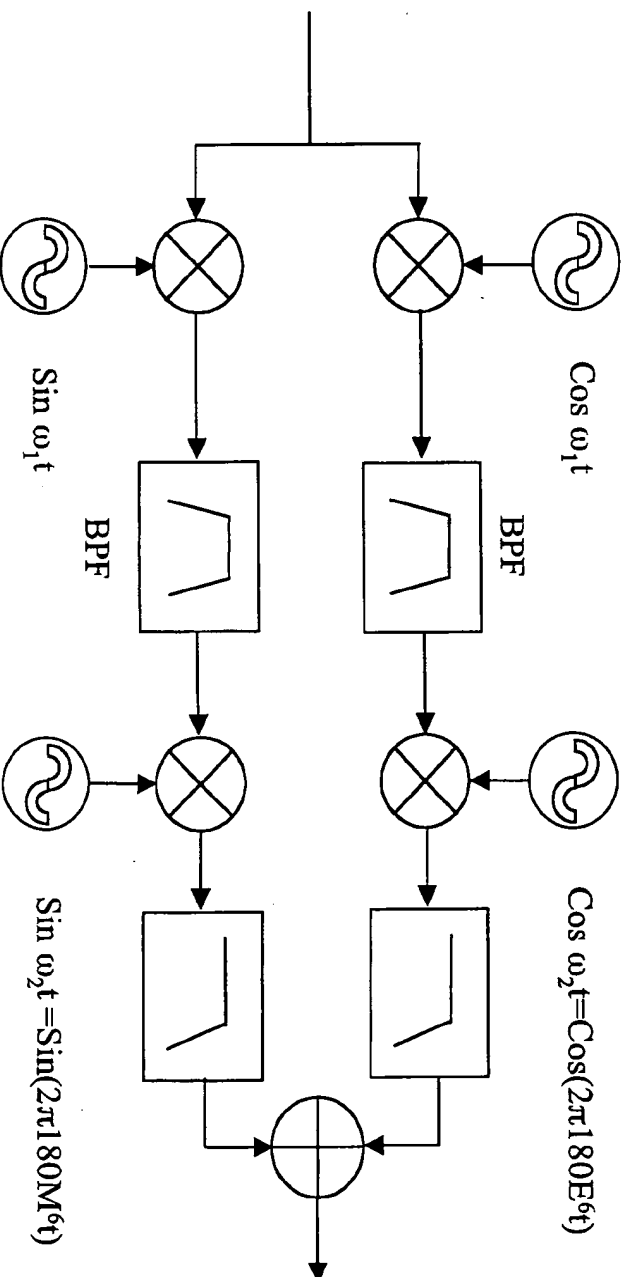
# Adding QAM Digital Demodulators

## F16-20



# Mixer Architecture

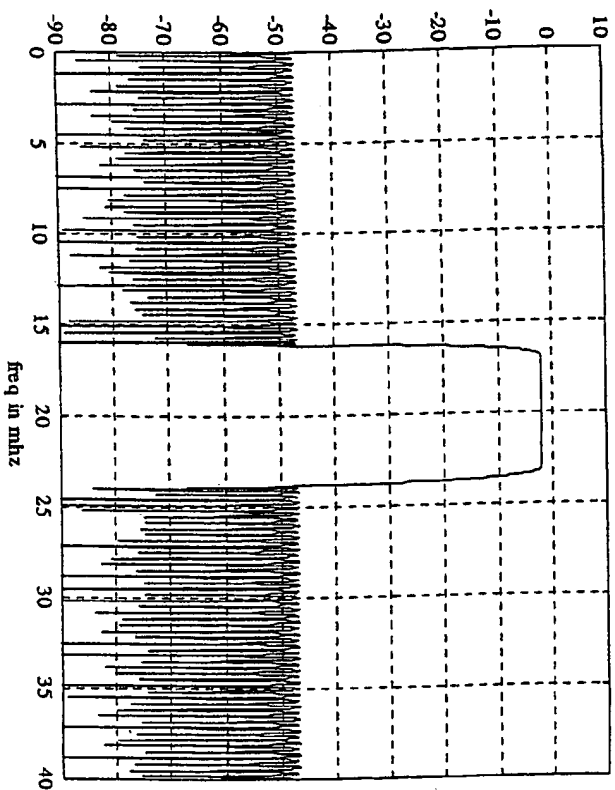
## F16-21



# Digital Band Pass Filters

F1622

Frequency Response of Digital SAW Filter



F16-23

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# Tuner Mixer

## First Silicon Results

SECRET

# Mixer Performance $F=16-24$

- $+3 \text{ dB}_m \text{ IP}_3$ 
  - $+5$  to  $+10 \text{ dB}_m \text{ IP}_3$  in second silicon
- 35 dB of Local Oscillator reverse isolation
- $> 30 \text{ dB}$  of Local Oscillator suppression
- $> 60 \text{ dB}$  of on channel suppression



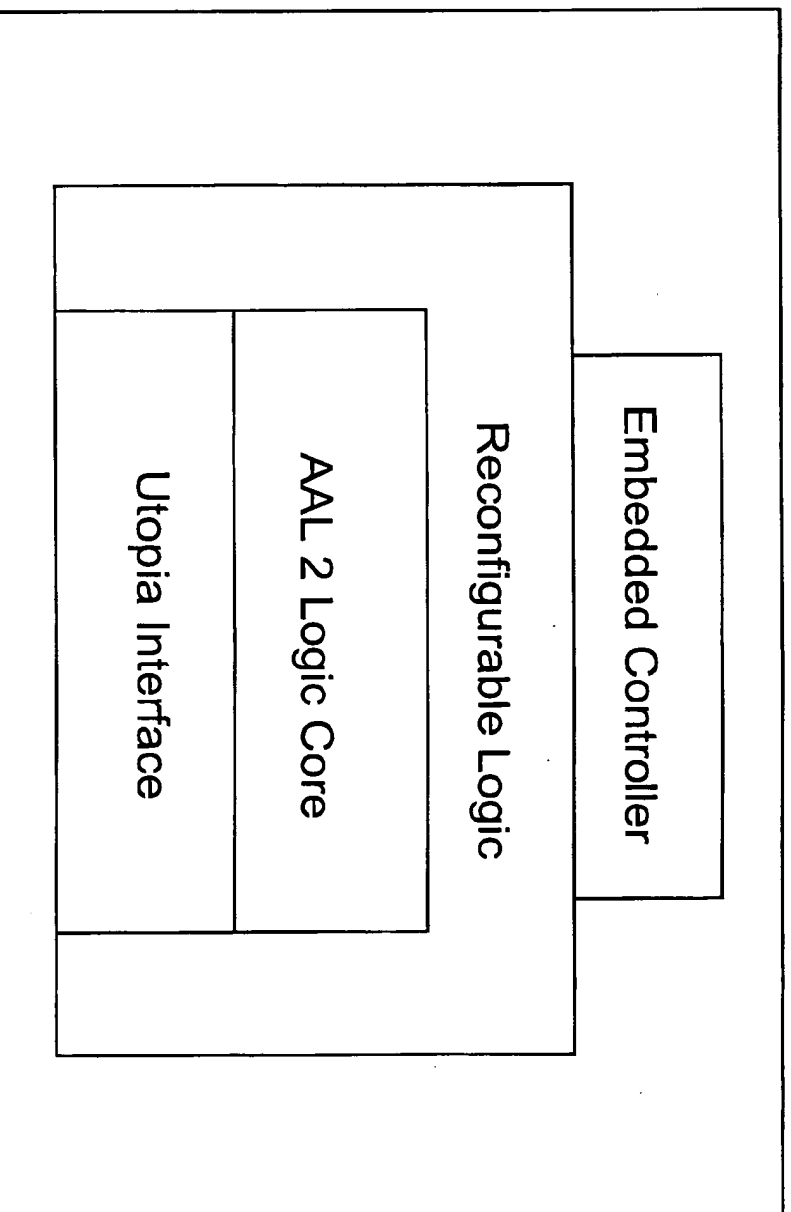
1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

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# Appendix I Reconfigurable ATM Adaptation Layer 2 Router

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F16-26



## Appendix I

F16.27

### Reconfigurable ATM Adaptation Layer 2 Router (Continued)

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- The AAL 2 core is the heart of the RAAL 2 Router
- Programmable, or reconfigurable, logic surrounds the core
- Programming is accomplished through the embedded processor unit
- As the home network changes and/or market trends drive hardware and networking technologies, the RAAL 2 device can adapt and scale its capability meet a wider range demands.